



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.     | CONFIRMATION NO. |
|---|-------------|----------------------|-------------------------|------------------|
| 10/565,291  | 01/20/2006  | Rodney A. Mattson    | PHUS030241US            | 9784             |
| 38107 7590 10/23/2007<br>PHILIPS INTELLECTUAL PROPERTY & STANDARDS<br>595 MINER ROAD<br>CLEVELAND, OH 44143 |             |                      | EXAMINER<br>HO, ALLEN C |                  |
|   |             |                      | ART UNIT                | PAPER NUMBER     |
|   |             |                      | 2882                    |                  |
|   |             |                      | MAIL DATE               | DELIVERY MODE    |
|   |             |                      | 10/23/2007              | PAPER            |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/565,291

Applicant(s)

MATTSON ET AL.

Examiner

Allen C. Ho

Art Unit

2882

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,6-16 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 2-5 and 17-19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 20060120.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Drawings*

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "12" has been used to designate both stationary gantry (page 5, line 13) and CT scanner (page 5, line 29; page 6, line 19).
2. Fig. 3 is objected to because reference number **84** is not directed at an end cap.
3. Fig. 5 is objected to because reference number **82** is split in the middle.
4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **104** (page 7, line 30 - page 8, line 7), **132** (page 9, lines 16-20).
5. Fig. 9 is objected to because reference number **106** is not directed to the electronics.
6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the subject matter claimed in claim 8 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the

Art Unit: 2882

drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### *Specification*

7. The abstract of the disclosure is objected to because reference number 12 should be replaced by --10--. Correction is required. See MPEP § 608.01(b).

### *Claim Objections*

8. Claim 7 is objected to because of the following informalities:

Claim 7 recites the limitation "the anti-scatter vanes" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

9. Claim 8 is objected to because of the following informalities:

Claim 8 recites the limitation "the anti-scatter vanes" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

10. Claim 12 is objected to because of the following informalities:

Art Unit: 2882

Claim 12 recites the limitation "the scintillation elements" in line 6. There is insufficient antecedent basis for this limitation in the claim.

Appropriate correction is required.

11. Claims 16 and 17 are objected to because of the following informalities:

Claims 16 and 17 should depend on claim 15.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 21 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 21 and 22 claim an alignment apparatus. However, claims 21 and 22 fail to set forth structures of the alignment apparatus. Instead, claims 21 and 22 recite elements (radiation detector, anti-scatter module, rectangular grid) that are not part of the alignment apparatus. The recitation "for a radiation detector ...." has been interpreted as intended use for the alignment apparatus. As noted in MPEP § 2114, an apparatus claim must be structurally distinguished from the prior art. The patentability of an apparatus claim cannot be ascertained when its structure is indefinite.

***Claim Rejections - 35 USC § 102***

14. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

15. Claims 1, 6, 12, 15, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Adachi *et al.* (U. S. Patent No. 6,304,626 B1).

With regard to claim 1, Adachi *et al.* disclosed a two-dimensional radiation detector that comprises: a first alignment means for aligning an anti-scatter module (11) with a spatial focus (2); a second alignment means for aligning the anti-scatter module with a detector subassembly module (5) including a substrate and an array of detector elements (6) arranged on the substrate to detect radiation and a radiation absorbing mask (14) formed as a grid and arranged between the array of detector elements and the anti-scatter module.

With regard to claim 6, Adachi *et al.* disclosed the radiation detector as set forth in claim 1, wherein the anti-scatter module includes a plurality of anti-scatter vanes (11) formed of a material is substantially absorbing for radiation (column 4, lines 49-65).

With regard to claim 12, Adachi *et al.* disclosed the radiation detector as set forth in claim 1, wherein the detector element array includes a scintillator array (12) that produces scintillation events responsive to radiation; and a photodetector element array (13), each

Art Unit: 2882

photodetector element of the array being arranged to view one of the scintillation elements of the scintillation array.

With regard to claim 15, Adachi *et al.* disclosed a method for manufacturing a radiation detector for a computed tomography scanner, the method comprises: aligning an anti-scatter module (11) with: a detector subassembly module (5) including a substrate and an array of detector elements (6) arranged on the substrate to detect radiation, and a radiation absorbing mask (14) disposed between the anti-scatter module and the detector elements of the array.

With regard to claim 20, Adachi *et al.* disclosed the method as set forth in claim 15, the method further includes: defining uniform apertures in the radiation absorbing mask to precisely fix an amount of radiation received by each detector element of the array (Fig. 9E).

16. Claims 1, 6-8, 10-15, and 20 are rejected under 35 U.S.C. 102(e) as being anticipated by Hoffman (U. S. Patent No. 6,934,354 B2).

With regard to claim 1, Hoffman disclosed a two-dimensional radiation detector that comprises: a first alignment means for aligning an anti-scatter module (84) with a spatial focus (14); a second alignment means for aligning the anti-scatter module with a detector subassembly module (20) including a substrate and an array of detector elements (column 5, lines 19-23) arranged on the substrate to detect radiation and a radiation absorbing mask (90) formed as a grid (column 3, lines 8-22; column 7, lines 60-65) and arranged between the array of detector elements and the anti-scatter module.

With regard to claim 6, Hoffman disclosed the radiation detector as set forth in claim 1, wherein the anti-scatter module includes a plurality of anti-scatter vanes (88) formed of a material is substantially absorbing for radiation (column 7, lines 2-6).

With regard to claim 7, Hoffman disclosed the radiation detector as set forth in claim 6, wherein the radiation absorbing mask includes: first strips parallel to the anti-scatter vanes (along Z axis), wherein the first strips (Ws) are wider than a thickness (Wc) of the anti-scatter vanes and are equal to greater than a gap (Wr) between the elements of the detector array (column 6, lines 13-64).

With regard to claim 8, Hoffman disclosed the radiation detector as set forth in claim 6, wherein the radiation absorbing mask includes: second strips (along X axis) perpendicular to the anti-scatter to the anti-scatter vanes (along Z axis), wherein the second strips are of substantially a same dimension as a gap between the detector elements (Ws is substantially a same dimension as Wr).

With regard to claim 10, Hoffman disclosed the radiation detector as set forth in claim 1, wherein the radiation absorbing mask defines precise apertures, which align with and set a resolution of the elements of the detector array (column 3, lines 8-22; column 7, lines 60-65).

With regard to claim 10, Hoffman disclosed the radiation detector as set forth in claim 1. Claim 10 is treated as a product-by-process claim. A product-by-process claim is not limited to the method of manufacture, only the structure implied by the method. MPEP § 2113.

With regard to claim 12, Hoffman disclosed the radiation detector as set forth in claim 1, wherein the detector element array includes: a scintillation array (56) that produce scintillation events responsive to radiation; and a photodetector element array (52), each photodetector element (60) of the array being arranged to view one of the scintillation element of the scintillation array to convert light from the scintillation events into electrical signals.



With regard to claim 13, Hoffman disclosed the radiation detector as set forth in claim 11, wherein the scintillation element array is arranged in a two-dimensional rectangular array (column 5, lines 13-23) with a rectangular array of interfaces between adjoining scintillation elements (Fig. 6), and the radiation absorbing mask includes: a rectangular array of strips of a radiation absorbing material that defines the grid, the strips overlaying interfaces between adjacent scintillation elements (Fig. 6).

With regard to claim 14, Hoffman disclosed a computed tomography scanner that includes: an x-ray source (14) mounted to rotate about an examination region (48), the x-ray source emitting a cone-shaped x-ray beam from a radiation focal point and traversing the examination region; a two-dimensional radiation detector (18) which receives the cone beam of radiation that has traversed the examination region, the radiation detector including a plurality of detector modules (20), each detector module including: an anti-scatter module (84), a detector subassembly module aligned with the anti-scatter module, each detector subassembly module including a substrate and an array (52) of detector elements (60) arranged on the substrate to detect radiation, and a radiation absorbing mask (90) formed as a grid (column 3, lines 8-22; column 7, lines 60-65), the mask being arranged between and aligned with the array of the detector elements and the anti-scatter module; and a reconstruction processor (34) for reconstructing signals from the detector element array into a volumetric image.

With regard to claim 15, Hoffman disclosed a method for manufacturing a radiation detector for a computed tomography scanner, the method comprises: aligning an anti-scatter module (88) with: a detector subassembly module including a substrate and an array (52) of

Art Unit: 2882

detector elements (60) arranged on the substrate; and a radiation absorbing mask (90) disposed between the anti-scatter module and the detector elements of the array.

With regard to claim 20, Hoffman disclosed the method as set forth in claim 15, the method further includes: defining uniform apertures in the radiation absorbing mask to precisely fix an amount of radiation received by each detector element of the array (column 3, lines 8-22; column 7, lines 60-65).

***Claim Rejections - 35 USC § 103***

17. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

18. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adachi *et al.* (U. S. Patent No. 6,304,626 B1) as applied to claim 6 above, and further in view of Tang (U. S. Patent No. 5,949,850).

With regard to claim 9, Adachi *et al.* disclosed the radiation detector as set forth in claim 6. However, Adachi *et al.* failed to disclose a radiation absorbing mask having stepped edges, which interleave with stepped edges of adjacent radiation absorbing masks.

Tang disclosed a radiation absorbing mask having stepped edges, which interleave with stepped edges of adjacent radiation absorbing masks (Fig. 2). Manufacturing a plurality of small radiation absorbing masks are preferred over manufacturing a large radiation absorbing mask because small radiation absorbing masks can be made accurately (column 4, lines 28-31).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a plurality of radiation absorbing masks having stepped edges for mating with adjacent radiation absorbing masks, since a person would be motivated to form a large radiation mask accurately.

19. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman (U. S. Patent No. 6,934,354 B2) as applied to claim 6 above, and further in view of Tang (U. S. Patent No. 5,949,850).

With regard to claim 9, Hoffman disclosed the radiation detector as set forth in claim 6. However, Hoffman failed to disclose a radiation absorbing mask having stepped edges, which interleave with stepped edges of adjacent radiation absorbing masks.

Tang disclosed a radiation absorbing mask having stepped edges, which interleave with stepped edges of adjacent radiation absorbing masks (Fig. 2). Manufacturing a plurality of small radiation absorbing masks are preferred over manufacturing a large radiation absorbing mask because small radiation absorbing masks can be made accurately (column 4, lines 28-31).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to provide a plurality of radiation absorbing masks having stepped edges for mating with adjacent radiation absorbing masks, since a person would be motivated to form a large radiation mask accurately.

20. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adachi *et al.* (U. S. Patent No. 6,304,626 B1) as applied to claim 15 above, and further in view of Eidam *et al.* (U. S. Patent No. 6,951,628 B2).

With regard to claim 16, Adachi *et al.* disclosed the method as set forth in claim 15. However, Adachi *et al.* failed to disclose forming a radiation absorbing mask by photoetching.

Eidam *et al.* disclosed a method of forming a radiation absorbing mask by photoetching, which is capable of producing a radiation absorbing mask of arbitrary geometry (column 5, lines 1-36).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a radiation absorbing mask by photoetching, since a person would be motivated to employ a method that is capable of producing a radiation absorbing mask of any geometry.

21. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman (U. S. Patent No. 6,934,354 B2) as applied to claim 15 above, and further in view of Eidam *et al.* (U. S. Patent No. 6,951,628 B2).

With regard to claim 16, Hoffman disclosed the method as set forth in claim 15. However, although Hoffman disclosed forming a radiation absorbing mask by chemical etching (column 7, lines 6-15), Hoffman failed to disclose forming a radiation absorbing mask by photoetching.

Eidam *et al.* disclosed a method of forming a radiation absorbing mask by photoetching, which is capable of producing a radiation absorbing mask of arbitrary geometry (column 5, lines 1-36).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to form a radiation absorbing mask by photoetching, since a person would

Art Unit: 2882

be motivated to employ a method that is capable of producing a radiation absorbing mask of any geometry.

***Allowable Subject Matter***

22. Claims 2-5 and 17-19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- (1) Ikhlef *et al.* (U. S. Patent No. 7,233,640 B2) disclosed a CT detector having an optical mask layer.
- (2) Ratzmann (U. S. Patent No. 7,190,759 B2) disclosed a support structure for z-extensible CT detectors.
- (3) Yasunaga *et al.* (U. S. Patent No. 7,177,387 B2) disclosed a self-aligning scintillator-collimator assembly.
- (4) Wear *et al.* (U. S. Patent No. 7,145,986 B2) disclosed a solid state x-ray detector with improved spatial resolution.
- (5) Pohan *et al.* (U. S. Pub. No. 2006/0198493 A1) disclosed a shadow mask for an x-ray detector.

Art Unit: 2882

- (6) Hefetz *et al.* (U. S. Pub. No. 2006/0118730 A1) disclosed a mask for a pixelated detector.
- (7) Elgali (U. S. Patent No. 6,982,423 B2) disclosed a CT detector module having radiation shielding.
- (8) Chappo *et al.* (U. S. Patent No. 6,917,664 B2) disclosed a CT detector module.
- (9) Igarashi *et al.* (U. S. Patent No. 6,587,538 B2) disclosed a CT detector module.
- (10) Saito *et al.* (U. S. Patent No. 6,396,898 B1) disclosed a CT detector module.
- (11) Dobbs *et al.* (U. S. Patent No. 5,487,098) disclosed a CT detector module.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen C. Ho whose telephone number is (571) 272-2491. The examiner can normally be reached on Monday - Friday from 9:00 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2882

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allen C. Ho/  
Primary Examiner  
Art Unit 2882

17 October 2007